CLAIMS

1. A surface acoustic wave device comprising:

a piezoelectric substrate;

a comb-shaped electrode formed on a first principal face of the piezoelectric substrate; and

a supporting substrate bonded to a second principal face of the piezoelectric substrate,

wherein the second principal face of the piezoelectric substrate is bonded to the supporting substrate via a metal layer.

2. The surface acoustic wave device of claim 1, wherein the supporting substrate includes a through-hole and an electric conductor provided inside the through-hole, and the electric conductor is electrically coupled to the metal layer.

3. The surface acoustic wave device of claim 1, wherein the metal layer is removed the metal in part.

4. The surface acoustic wave device of claim 1, wherein the piezoelectric substrate employs rotated Y-cut lithium tantalate.

5. The surface acoustic wave device of claim 1, the supporting substrate employs a substrate made of sapphire.

6. The surface acoustic wave device of claim 1, wherein the metal layer employs gold.

7. A method of manufacturing a surface acoustic wave device, the method comprising the steps of:

forming a first metal layer on a second principal face of a piezoelectric substrate having a first principal face and the second principal face;

forming a second metal layer on a principal face of a supporting substrate;

activating surfaces of the first and the second metal layers in plasma atmosphere;

bonding the first metal layer and the second metal layers together at room temperature; and

forming a comb-shaped electrode on the first principal face of the piezoelectric substrate.

8. The method of claim 7, wherein the first and the second metal layers are made of identical metal.

9. The method of claim 7 further comprising the steps of:

forming the first metal layer, of which metal is removed in part by lift-off, on the second principal face of the piezoelectric substrate;

forming the second metal layer entirely on the principal face of the supporting substrate; and

bonding the first metal layer and the second metal layer together at room temperature.

10. The method of claim 7 further comprising the steps of:

removing the metal in part from the first metal layer by etching after forming the first metal layer entirely on the second principal face of the piezoelectric substrate;

forming the second metal layer entirely on the principal face of the supporting substrate; and

bonding the first metal layer and the second metal layer together at room temperature.

11. The method of claim 7 further comprising the steps of:

bonding the first metal layer and the second metal layer together at room temperature;

providing the supporting substrate with a through-hole; and

forming an electric conductor covering at least an inner wall of the through-hole by at least one of sputtering and plating, and electrically coupling the electrical conductor covering the inner wall of the through-hole to the second metal layer.